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Two very wonderful engineering works have just been brought to a conclusion, both of the same character, — tunnels under rivers. The smaller, but the one of more interest to Americans probably, is that under the Mersey, between Liverpool and Birkenhead, which was opened a few days ago by the Prince of Wales. On the morning preceding the opening, trains passed from James Street station on the Liverpool side, to Hamilton Square station on the Birkenhead side, in three minutes and a half. From the spot in the centre, where the mayors of Liverpool and Birkenhead many months ago shook hands over a piece of red tape, the tunnel extends two hundred and fifty yards in each direction in a perfectly straight line. The Severn tunnel is a much more gigantic work. As the river estuary is more than two miles wide, and from seventy to eighty feet deep, the subaqueous tunnel itself, and its approaches, extend to four miles in length. It has been constructed solely by the Great western railway company, at a total cost of nearly nine million dollars (£1,750,000), and its purpose is to facilitate the transfer of coal from the South Wales coal-field to Southampton, and other places in the south and west of England. Recently coal raised at Aberdare in the morning, was shipped at Southampton (on mail steamers, etc.) in the evening. The tunnel is not yet opened for passenger traffic. The greatest difficulty in its construction; arose from the intrusion of water, not from the Severn alone, but from springs in the Pennant grit and other geological strata, two or three miles away. The source of this water, in the early days of the tunnel construction (1877-78) was first shown by the present writer.

The scientific relief fund, which is held in trust by the president and council of the Royal society, is likely to receive a very welcome addition to its resources from Sir William Armstrong. The existence of the fund dates from 1859, and is in great measure due to the exertions of the late Mr. Gasiot. The interest is applied to the relief, under certain conditions, of such scientific men or their families as may from time to time require assistance. Since January, 1861, when the first grant was made, about £4,600 have been distributed in nearly one hundred grants. The present amount of the trust is £7,000, and Sir William Armstrong is very anxious to see it raised to £20,000. He therefore proposes himself to give half the sum required, provided that the fellows, with the assistants, if necessary, of other friends of science outside of the society, will raise the remaining £6,500. Several contributions towards this end have already been promised, and it is hoped that there will be no difficulty in making up the sum

required, as the present income of the fund is by no means equal to the demands upon it. W.

London, Jan. 24.

NOTES AND NEWS.

THE recent unusual cold weather in Florida, which caused so much injury to fruit-trees, is said to have destroyed in some places large numbers of fish in the shallow waters, benumbing them, and permitting them to be cast on the beaches in windrows.

— Dr. J. W. McLaughlin, president of the Texas state microscopical society, claims to have discovered sphero-bacteria in that peculiar southern disease known as dengue, or 'break-bone' fever, and further to have isolated and cultivated them.

— It is interesting to note, that, at a recent meeting of the Royal geographical society, Admiral Sir Leopold McClintock said that "it was a companion of Major Greeley, the late lamented Lieut. Lockwood, who had made the nearest approach to the north pole yet accomplished."

— We call attention to a new map of the Congo, corrected up to October, 1885, that has just been issued by Letts, Son, & Co., of London. The topography is laid down in great detail, the scale being 45 miles to the inch.

— The German parliament has again appropriated 30,000 marks, or about \$7,500, to assist Dr. Dohrn's zoölogical institution at Naples.

— The New York *Herald* of Feb. 5 states that M. de Jousselin, commander of the steamship St. Laurent, reports observing on his last easterly voyage a magnificent aurora borealis far out on the ocean. The St. Laurent was at the time in latitude 44° 20' north, longitude 57° 3' west. The brilliant phenomenon extended from west-north-west almost to north-east, the luminous rays, white and red, mounting up to about seventy degrees above the horizon, and stars of the first magnitude were visible through the blue rays. The observations show that the aurora occurred in connection with a cloud-covered sky and in the rear of a storm which had a short time previously passed the steamer.

— The progress of psychical research has been most marked in England, but has not failed to attract attention in Germany, France, and the United States. A journal especially devoted to the historical and experimental "begründung der übersinnlichen weltanschauung auf monistischer grundlage," has been established in Germany. The journal is called *Sphinx*, and will be issued monthly by L. Fernau of Leipzig. Dr. T. U.

Hübbe-Schleiden is the editor, and associated with him are Alfred Russel Wallace, F.R.G.S., Prof. W. F. Barrett of Trinity college, Dublin, and Prof. Elliott Coues of Washington.

—Those interested in psychical research may be interested to know that the Proceedings of the American society are on sale with Cupples, Upham & Co., at thirty-five cents each.

—An international copyright law has never been defeated in either house of congress, nor has one been discussed in either since Henry Clay, in 1837, brought in the first bill of the kind. Now and then there have been hearings before congressional committees; and a favorable report was made in 1868, which was never acted on, however; and an unfavorable report, based on the narrow view of the constitutional power of congress, was later made by Senator Morrill of Maine. In the last congress the Dorsheimer bill for international copyright, pure and simple, without any conditions requiring the printing in this country of copyrighted books, was favorably reported, but congress adjourned without action. Before the present congress, there are now two bills, — one offered by Senator Hawley, similar to the Dorsheimer bill; and the other by Senator Chace, which is intended to favor the manufacturing interests.

—Prof. E. D. Cope is now engaged upon a 'Catalogue of the amphibians and reptiles of Central America and Mexico,' which is shortly to be issued. It will be the most important and complete contribution ever published on the amphibians of these two countries.

—The commerce committees of both houses of congress have decided to report favorably the bill proposing to send a commission to Mexico and South America to investigate the question of yellow-fever inoculation. Two of the members of the commission will be selected from the government service, and a third will be chosen from civil life.

—The annual report of the National academy of sciences for the past year was submitted to the senate on Monday, Feb. 8.

—The U. S. geological survey has at present but two exploring parties in the field, owing to the severity of the winter. One of these is in western Georgia, engaged in studying the southern extension of the archæan formations, under the charge of Professor Pumpelly; the other, under the direction of Mr. Garlick, is making a topographical survey of the valley of the Gila, California. Experience has shown that winter is the best time to work in this field.

—Readers of *Science*, old and new, may be in-

terested in some brief statistics concerning the paper, drawn from the editor's books. During the nearly three years since its establishment, up to January, 1886, payments of greater or less amounts have been made for contributions to the columns of the paper to four hundred and twenty-seven different persons outside the editorial office. Of course, this number would be materially increased if contributors who have not been paid were to be included in the list. The number of persons who have repeatedly furnished contributions on direct request of the editors is one hundred and forty-four. These facts furnish distinct evidence of the place that *Science* is taking in American literature, and of the breadth of the field it cultivates.

—The twenty-third bulletin of the U. S. geological survey, by Messrs. R. D. Irving and T. C. Chamberlin, treats of the relation of the Keweenaw series and the Potsdam sandstones. Geologists have held very different views concerning the relation of these beds, as the readers of *Science* will remember, from the discussion in vol. i. The writers give a clear exposition of their views, with full descriptions and history of the subject, illustrated by a number of excellent engravings. Their conclusions, briefly, are as follows. The Keweenaw series very greatly antedated, in its formation, the Potsdam sandstone, and occupied a lapse of time immensely vaster, and was a period characterized by some of the most remarkable displays of igneous activity of which the world has been a witness. They were succeeded by a long interval of erosion, before the close of which a longitudinal fault was developed along the face of the present trapezian terrane. Subsequently they were submerged beneath the Potsdam seas, and the eastern sandstone was laid down unconformably against and upon the Keweenaw series. Later, after the deposition and erosion of the Trenton, and possibly other members of the Silurian, minor faulting took place along the old break. Should these ingenious conclusions be sustained, an important change must be made in the stratigraphy of the lower Silurian. In any event, the work is to be commended for the clearness with which the facts are presented and the conclusions drawn.

—The last annual report on the vital statistics of Selma, Ala., gives some interesting facts in regard to the death-rate and disease among the whites and blacks. The population of the city is a little less than ten thousand, more than one-half of which are negroes. The death-rate from all causes for 1885 among the whites was 15.1 per thousand, while among the blacks it was 28.65. Malarial fever was three times, consumption four times, meningitis and Bright's disease, twice, as

fatal among the blacks as among the whites; while diphtheria, singularly, was three times as fatal to the whites as to the blacks.

—The New York academy of sciences announces a lecture, free to the public, at the library building of Columbia college, on March 8, by Prof. George F. Barker, on 'Radiant matter.'

LETTERS TO THE EDITOR.

**Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

International geological congress at Berlin.

I send you the following from a paper on the 'Third session of the International geological congress' (*Journ. math. phys. nat. sc.*, Lisbon), sent me by the author, Mr. Paul Choffat, one of the most important and independent members of the late congress. His strictures are only too just, and his criticisms are well worthy of attention.

After briefly sketching the incidents connected with the origin and the assembling of this congress, already familiar, M. Choffat remarks, "A goodly number of the 255 persons, representing 17 countries, came to make a scientific-artistic visit to Berlin, or to make numerous acquaintances among their *confreres*. These must have been completely satisfied; but it is otherwise with those who came to hear treated the subjects which formed the end of the congress. These, I fancy, will unanimously agree that this end was a little neglected." He reminds his readers how important it is, and how much time it saves, to discuss questions among representatives of different countries where the answer comes at once, instead of waiting for months, or even years; and he complains that half of the afternoon sessions were devoted to scientific communications on subjects not particularly interesting to the congress, and which will be more profitable to those who read than to those who heard them. "Granting that there was an average of an hour and a half to each *seance*, in the four consecrated to debate there was a total of six hours." He complains that the report of the sessions at Zurich and Poix simply stated that a number of answers had been received, both from the national committees and from men of science acting spontaneously, but that the nature of these answers and the names of the *savants* were not given. In answer to the reproach of the international committees' report, that many national committees had not furnished the material that was expected of them, he says that the reason of this is plain, and unfortunately exists yet: it is, that the limits of the divisions have not been fixed; and, after taking the trouble to send a map made on this or that division, one is in danger of receiving it back again with the request to make another copy. In the last four *seances*, which ought to have been devoted to the discussion of questions of nomenclature, only the point of view of the map was considered. This ought to furnish those who look upon the map as simply a first edition, to serve as a basis for the discussions of future congresses, food for reflection. He thinks that the first mistake was to commence the publication of a map without settling the principles on which it should be based. He gives the following summary of the constitution of the three congresses thus far held: Paris, 194 Frenchmen and 110 foreigners, representing 20 countries; Bologna, 149 Italians and 75 foreigners,

from 16 countries; Berlin, 163 Germans and 92 foreigners, representing 17 countries. "What geologist would sacrifice his convictions to such a heterogeneous assemblage?" He thinks that not only ought the number of those voting to be much reduced, but they should not vote by countries. Instead of this, he proposes that they should vote by geological basins, and that the voters should therefore be different for every geological question raised. He concedes that it would be very difficult, if not impossible, to create such a bureau or bureaus; but he thinks that some approach to it might be made, even if voting was not permitted, but the subject was elucidated by the longest and freest discussion of each subject possible. Finally, he thinks that a great centre ought not to be chosen for the place of meeting of the congress, as the distractions are too great, and therefore he is in favor of Professor Hughes's proposition (which, however, was voted down) to hold the next session in Cambridge instead of London. M. Choffat concludes this somewhat dissatisfied commentary on the congress by acknowledging, that, "in spite of all the weak points of the three sessions of the congress, they have done much for the science of geology directly and indirectly;" and as an example of the latter influence he points to the splendid map of France, on a scale of 1:500,000, undertaken by geologists who have not any official mandate, and yet have not shrunk from the task of its publication.

Permit me to replace by my full name the first two letters of it, signed to the translation of Stelzner's letter in your issue of Jan. 22.

PERSIFOR FRAZER.

Philadelphia, Feb. 3.

Cliff-picture in Colorado.

Professor Tillman's note on a cliff-picture in Colorado (*Science*, vii. p. 80) leads me to send this account of the same object from notes made on the spot in August, 1871, and published in *Old and new*, a Boston magazine, since discontinued, in December of that year:—

The Bear Rock is a comparatively smooth face of a sandstone bluff that extends about sixty feet above the water, from which it is distant a hundred or more yards. Upon the exposed surface of the rock, about ten feet from the bottom of the cliff, is an excellent life-size representation, in profile, of a three-year-old cinnamon bear. The figure is dark brown, approaching black, being darker on the anterior half. The outline is distinct and perfect, unless exception may be taken to a slight blurring at the bottom of the hind-feet and a somewhat pronounced excess of the claws of the fore-feet. From the tail to the nose the length is about six feet, and the height at the shoulders is about three and a half feet. These are merely approximate dimensions; the writer having no facilities for exact measurement at the time of his inspection, Aug. 8, 1871. The legs are all visible, and the head points straight to the front, as if just about to take, or just having taken, a step. The fore feet are on a slightly higher plane than the hind ones, as if on rising ground. The expression is one of surprise and alarm: the head is thrust forward and slightly upward, the ears are sharply cocked forward as if on the alert, and the whole attitude displays the utmost fidelity to that of a bear in some excitement and apprehension. There is no room for a moment's doubt as to the animal, or the state of mind in which